IN THE UNITED STATES DISTRICT COURT FOR

THE DISTRICT OF MASSACHUSETTS

NUANCE COMMUNICATIONS, INC., Plaintiff and Counterclaim Defendant, v. OMILIA NATURAL LANGUAGE SOLUTIONS, LTD., Defendant and Counterclaim Plaintiff.	**Case No. 1:19-cv-11438-PBS**

NUANCE COMMUNICATIONS, INC.'S OPPOSITION TO OMILIA NATURAL LANGUAGE SOLUTIONS, LTD.'S MOTION FOR PARTIAL SUMMARY JUDGMENT OF INVALIDITY UNDER 35 U.S.C. § 101 OF U.S. PATENT 8,532,993

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I. INTRODUCTION

In this premature motion for partial summary judgment,[1] Omilia relies on the obsolete "machine-or-transformation" standard used by the patent examiner during prosecution of the '993 Patent, seeks to mix-and-match legal standards in a logically inverted analysis, mis-applies the *Alice* standard, and ignores the actual technology taught by the '993 Patent.

The '993 Patent relates generally to the field of computerized automated speech recognition (ASR). In particular, it teaches a method of improving overall speech recognition accuracy by shifting selected data about word pronunciations from an ASR system's dictionary (or lexicon) to the language model. '993 Patent, Abstract, col. 1:21-24, 2:20-40. *See* Nuance's Separate Statement of Facts ("SSOF") ¶ 15.

In a recent amicus brief to the Supreme Court, former Chief Judge of the U.S. Court of Appeals for the Federal Circuit, Randall Rader argued that Section 101 should be "wielded like a scalpel, not a sledgehammer" because it is a judicially created exception to statutory text. Br. of The Hon. Randall R. Rader (Ret.) and Chargepoint, Inc., as *Amici Curiae* Supporting Petitioner, *The Chamberlain Grp., Inc. v. Techtronic Indus. Co. Ltd., et al.*, No. 19-1299, (July 8, 2020) (https://www.supremecourt.gov/DocketPDF/19/19-1299/147226/20200708134854328_19-1299-Amicus-a.pdf), at 4-6. Omilia's motion invites exactly the kind of heavy-handed over-use of Section 101 that Judge Rader argues should be limited. The '993 Patent is a specific computer-oriented improvement to a computer-implemented technology, and is patentable subject matter under either step of *Alice*. *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 573 U.S. 208 (2014).

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[1] Because Omilia's motion would not dispose of all pending claims, it is properly characterized as a motion for *partial* summary judgment. Fed. R. Civ. P. 56(a); 54(b). Further, because Omilia has chosen to file this motion so early in the proceedings and has not relied on any evidence other than the patent and its file history, its motion is in many respects analogous to a Rule 12(c) motion for judgment on the pleadings, which is an increasingly disfavored mechanism for addressing Section 101 issues. Moreover, as set forth in the declaration of Nuance's expert (Chris Schmandt) filed in support of Nuance's Opposition, there is significant technical evidence to support patentability of the '993 Patent.

II. FACTUAL BACKGROUND

A. The '993 Patent Solves a Technical Problem

The '993 Patent is directed to methods to improve speech recognition systems—computerized systems that attempt to accurately recognize a speaker's speech. Specifically, the patent is directed to improving the performance of large vocabulary speaker independent recognizers, by changing the way such recognizers represent linguistic information and use this to recognize speech. "The availability of large databases has yet to provide speech recognition to an optimal level. What is needed in the art are improved approaches of providing speech recognition given the availability of large databases." '993 Patent, col. 1:66-2:2. SSOF ¶ 16.

Speech recognition systems are conventionally broken up into phonemic acoustic models, pronouncing dictionaries in terms of the phonemic units in the acoustic model and language models in terms of lexical units [i.e., the word] from the pronouncing dictionary. *Id*., col. 3:26-29, 1:45-46. The '993 Patent invented a "new method for incorporating pronunciation probabilities into recognition systems by moving them from the pronouncing lexicon (dictionary) into the language model." *Id.*, 3:30-33. By design, the resulting "language model" allows for "pronunciation dependencies across word boundaries" which enables the recognizer to realize "contextual dependencies like geminates or consistency in pronunciation style throughout the utterance" which was not possible in the traditional speech recognition systems. *Id*., 3:33-37. SSOF ¶¶ 17-18. *See* Declaration of Chris Schmandt in Support of Nuance Communications, Inc.'s Opposition to Omilia's Motion for Partial Summary Judgment of Invalidity Under 35 U.S.C. § 101 of U.S. Patent 8,532,993 ("Schmandt Dec.") ¶¶ 14–43. SSOF ¶¶ 36-72.

The '993 Patent specification explains that the various claimed inventions and embodiments are aimed at improving speech recognition. "One embodiment relates to moving the pronunciation model from a pronunciation dictionary to a language model and how that improves recognition." '993 Patent, col. 3:19-22. In contrast with prior art systems, "the introduction of pronunciation dependent word pairs as lexical items changes the behavior of the language model to approximate higher order n-gram language models, also resulting in improved

recognition accuracy." *Id*., col. 3:45-51. Further, "[a]dding pronunciation probabilities to the lexicon is an improvement, when the acoustic model was trained with those alternatives. Recognition accuracy improved even when only a handful of words have pronunciation alternatives especially if they are some of the most frequent words." *Id*., col. 7:16-20. *See also* Abstract ("Recognition improvement is found by moving a pronunciation model from a dictionary to the language model."). SSOF ¶¶ 19-20.

The specification provides, "it is clear that it is advantageous to allow the language model to extract all the available information from the fact that some words commonly have different pronunciations" such as geminates,[2] "which is not easy through pronunciation modeling within a dictionary," other word variants can be realized such as "the distinction between common variants where the reduction in a vowel determines the difference between the verb and the noun type … could also significantly contribute to performance improvements." *Id*., col. 7:33-41. In another embodiment, "adding the most frequent pronunciation triples (effectively the same as adding word trigrams)" to the language model, despite their low frequency of occurrence, "still resulted in a modest performance improvement, as shown in the graph 600 of FIG. 6." *Id*., col. 9:35-39; Schmandt Dec. ¶¶ 37–43. SSOF ¶ 21, 64-72.

In developing a language model with pronunciation probabilities, the "lexical items become pronunciation dependent and that pronunciation modeling becomes the provenance of the language model and not the dictionary." *Id*., col. 10:62-65. This is an advantage, because it "allows for better modeling of coarticulation and part-of-speech differences in pronunciation, resulting in a modest gain using a modest number of thus modeled pronunciations." *Id*., col. 10:65-11:5. Performance improvement can be shown by making such a shift on as few as 17 words in a vocabulary of over 60,000 words. *Id*.; Schmandt Dec. ¶¶ 16, 35–39. SSOF ¶¶ 23-24, 39-42, 61-66.

[2] A geminate occurs when the last phoneme of word is the same as the first phoneme of the next; they usually just combine. Schmandt Dec. ¶ 40. SSOF ¶¶ 22.

To incorporate pronunciation probabilities into the language model in existing systems, a large amount of training data of "phonetically transcribed speech" is needed. *Id*., col. 9:64-67.[3] Another aspect of the invention is to "approximate large quantities of transcribed speech" by using some transcribed speech by a plurality of speakers. *Id*., col. 10:2-5. As explained in the specification, the underlying database used in developing the system "has a few minutes of speech by a few thousand speakers, the NAB has several minutes by a couple of thousand speakers." *Id*., col. 10:5-8. The result is the system "creates a large body of text with matching pronunciations which are consistent throughout the utterance" as shown in in the steps in Fig. 10. *Id*. The language model that is built from this process will reflect dependencies of individual pronunciation models such as the different pronunciations of geminates which can be realized by flapping, glottalizing, aspirating or deleting. *Id*., col. 10:34-38. The building of the language model combines the features of all the pronunciation models. *Id*., col. 10:43-44. This process "artificially creates a large body of text with matching pronunciations which would be consistent throughout the utterance." *Id*., col. 10:53-55. Schmandt Dec. ¶¶ 43–44. SSOF ¶¶ 25-27, 70-73.

Claim 1 claims aspects of the invention described in the specification. The claim requires "approximating transcribed speech, via a processor," that uses "a phonemic transcription data set associated with a speaker" where "the phonemic transcription dataset is based on a pronunciation model of the speaker" to yield a language model. This solves the problem of transcribing a large amount of text-based corpus of speech typically used for a language model (based solely on words) into phonemically transcribed speech needed for the claimed language model. Schmandt Dec. ¶ 44. Additionally, this allows for phonetically realizing different ways the same word, word pairs, or different words that have the same acoustic features, using only a small dataset associated with a speaker based on the way words can be pronounced. Building on this concept,

[3] "Phonetically transcribed speech" is the identification of a sequence of phonemes, or sound units, from a spoken utterance. Schmandt Dec. ¶ 43 n.3. This is different from a final transcript of the words and sentences corresponding to that utterance.

pronunciation probabilities associated with the different pronunciations of the word are incorporated into the language model. *Id*., ¶¶ 44–47. The claim requires performing this process only for frequently spoken words. As shown in Fig 4, for example, modelling pronunciation probabilities in the language model for even a small number of words increases recognition performance, in a tradeoff of performance vs. processing time. *Id*., ¶ 38, 48. The final step of representative claim 1 is "after incorporating the pronunciation probabilities into the language model, recognizing an utterance using the language model." This is analyzing a user's speech into acoustical and lexical representations, based on the scheme described earlier in the claim, to determine which words were most likely spoken. *Id*., ¶ 49. SSOF ¶¶ 65, 73-78.

In sum, the '993 Patent describes a specific technique that can be used to improve computerized speech recognizer performance.

B. Examiner Solely Applied the "Machine-or-Transformation" Test, Not the *Alice* Framework

The July 2, 2012 patent application contained three similar independent claims—one method (or process) claim (claim 1), one system claim (claim 9), and one computer-readable medium claim (claim 17). The examiner applied the "machine-or-transformation test" in the November 5, 2012 Office Action, finding claims 1 and 17 ineligible under Section 101 because they did not recite a "machine." D.I. 130-4 at 5-7 (Sternberg Dec. Ex. D). Claim 9, covering the same subject matter, was not rejected under Section 101, and ultimately all claims were allowed by the examiner as patentable subject matter, once claims 1 and 17 were amended to recite a "machine." D.I. 130-5 (Sternberg Dec. Ex. E). SSOF ¶¶ 28-29.

In applying the machine-or-transformation test to a process (i.e., method) claim, the examiner stated that to be patentable subject matter "process" claim "must (1) be tied to another statutory category (such as a manufacture or a machine), or (2) transform underlying subject matter (such as an article or material) to a different state or thing" or otherwise the claim is unpatentable. Because the examiner found claim 1 was not tied to a statutory category (i.e., a machine), he found the claim was unpatentable for failing to "transform" the underlying subject

matter to "a different state or thing." Claim 17 was similarly rejected because the "computer readable medium" could have been "carrier waves" as opposed to some kind of physical storage medium. Claims 1 and 17 were rewritten to specify that the method is performed using a processor, and the claims were allowed because they were tied to a machine, thus satisfying the "machine-or-transformation" test. D.I. 130-5 (Sternberg Dec. Ex. E); D.I. 130-6 (Sternberg Dec. Ex. F). Claim 9 was accepted as patentable subject-matter as originally drafted.[4] No additional objections were raised about any of the dependent claims.

III. ARGUMENT

A. Legal Standards

Under Rule 56, summary judgment may be granted "if the movant shows that there is no genuine dispute as to any material fact and the movant is entitled to judgment as a matter of law." Fed. R. Civ. P. 56. "The role of summary judgment is to pierce the pleadings and to assess the proof in order to see whether there is a genuine need for trial. The burden is on the moving party to show, through the pleadings, discovery and affidavits, that there is no genuine dispute as to any material fact and that the movant is entitled to judgment as a matter of law. … The Court must view the entire record in the light most favorable to the non-moving party and indulge all reasonable inferences in that party's favor." *Amax, Inc. v. ACCO Brands Corp.*, 268 F. Supp. 3d 301, 304 (D. Mass. 2017) (citations and internal quotation marks omitted).

Patent eligibility under Section 101 is a question of law that may involve underlying questions of fact. *Interval Licensing LLC v. AOL, Inc.*, 896 F.3d 1335, 1342 (Fed. Cir. 2018); *see also MyMail, Ltd. v. ooVoo, LLC*, 934 F.3d 1373, 1379 (Fed. Cir. 2019).

[4] The examiner did not raise a Section 101 objection to claim 9. In the May 5, 2013 amendments, the applicant changed "storing instructions" to "having instructions stored." This nonsubstantive amendment was unrelated to the Section 101 issue raised by the examiner, and neither the applicant nor the examiner commented on this amendment. D.I. 130-5; D.I. 130-6.

Under Section 101, an invention is generally patentable if it qualifies as a "new and useful process, machine, manufacture, or composition of matter." 35 U.S.C. § 101. However, the Supreme Court has identified a judicially-created exception, such that "[l]aws of nature, natural phenomena, and abstract ideas are not patentable." *Mayo Collaborative Servs. v. Prometheus Labs.*, 566 U.S. 66, 70 (2012). In applying this exception, a court "must distinguish between patents that claim the building blocks of human ingenuity and those that integrate the building blocks into something more." *Alice*, 573 U.S. at 217. Courts must "tread carefully in construing this exclusionary principle lest it swallow all of patent law." *Id*. "[A]ll inventions at some level embody, use, reflect, rest upon, or apply laws of nature, natural phenomena, or abstract ideas." *Mayo,* 566 U.S. at 71.

In *Alice*, the Supreme Court laid out a two-step test for patent eligibility: first, courts must "determine whether the claims at issue are directed to a patent-ineligible concept," such as abstract ideas. 573 U.S. at 218.[5] The claims must be considered "in their entirety to ascertain whether their character as a whole is directed to excluded subject matter." *McRO, Inc. v. Bandai Namco Games Am. Inc*., 837 F.3d 1299, 1312 (Fed. Cir. 2016) (quoting *Internet Patents Corp. v. Active Network, Inc*., 790 F.3d 1343, 1346 (Fed. Cir. 2015)); *see also Elec. Power Grp., LLC v. Alstom S.A*., 830 F.3d 1350, 1353 (Fed. Cir. 2016) ("[W]e have described the first-stage inquiry as looking at the 'focus' of the claims, their 'character as a whole.'" (citations omitted)). Courts must "'be careful to avoid oversimplifying the claims' by looking at them generally and failing to account for the specific requirements of the claims." *McRO*, 837 F.3d at 1313 (citations omitted). *Alice* warns courts, however, to "tread carefully in construing this exclusionary principle lest it swallow all of patent law," because "[a]t some level, 'all inventions ... embody,

[5] As the Federal Circuit has observed, "[t]he 'directed to' inquiry … cannot simply ask whether the claims involve a patent-ineligible concept, because essentially every routinely patent-eligible claim involving physical products and actions involves a law of nature and/or natural phenomenon – after all, they take place in the physical world." *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1335 (Fed. Cir. 2016).

use, reflect, rest upon, or apply laws of nature, natural phenomena, or abstract ideas.'" 573 U.S. at 217 (quoting *Mayo*, 566 U.S. at 71). If the patent is not "directed to" a patent-ineligible concept, that is the end of the inquiry, and the patent is deemed patentable under Section 101. *E.g., Cardionet, LLC v. Infobionic, Inc.*, 955 F.3d 1358, 1371 (Fed. Cir. 2020) ("Because we conclude under *Alice* step one that the asserted claims … are not directed to an abstract idea, we do not reach *Alice* step two."); *McRO, Inc.*, 837 F.3d at 1316 (same).

Under *Alice* step two, which is reached only if the patent is "directed to" an ineligible concept, the court must conduct a further inquiry to determine whether the elements of the claim contain an "inventive concept sufficient to transform the claimed abstract idea into a patent-eligible application." *Alice*, 573 U.S. at 221. This may involve the claiming of "additional features." *Id.* Step two "is satisfied when the claim limitations involve more than performance of well-understood, routine, [and] conventional activities previously known to the industry." *Berkheimer v. HP Inc.*, 881 F.3d 1360, 1367 (Fed. Cir. 2018) (citations omitted). This inquiry is a question of fact. *Id.* at 1368, 1369. If such an extra element is present, the claim is patent-eligible under Section 101. *Sophos Inc. v. Rpost Holdings, Inc.*, No. CV 13-12856-DJC, 2016 WL 3149649, at *12 (D. Mass. June 3, 2016) (finding, alternatively, under *Alice* step two, patentable inventive concept in asserted patents because they "aim to solve a technical problem of electronic messages, which because of their form, present unique challenges for establishing proof of receipt and delivery").

If a court reaches *Alice* step two, summary judgment concerning patent-ineligibility is appropriate only "[w]hen there is no genuine issue of material fact regarding whether the claim element or claimed combination is well-understood, routine, [or] conventional to a skilled artisan in the relevant issue in the field." *Berkheimer*, 881 F.3d at 1368.

B. Omilia's Reliance on the '993 Patent's File History is Misplaced

In support of its motion, Omilia relies heavily on a portion of the prosecution history, dating to 2012, where the examiner rejected claims 1-8 and 17-20 under the outdated "machine-

or-transformation" test that had been articulated in *In re Bilski*, 545 F.3d 943, 954-956 (Fed. Cir. 2008) (en banc). The examiner made this abundantly clear, when stating, "a statutory 'process' under 35 USC 101 must (1) be tied to another statutory category (such as a manufacture or machine), or (2) transform underlying subject matter (such as an article or material) to a different state or thing." Nov. 5, 2012 Office Action (D.I. 130-4) at 3; *compare Bilski*, 545 F.3d at 954.[6] To the extent the examiner found claim 1 to be drawn to an "abstract idea," it is solely because it failed the "machine-or-transformation" test. *Id.* at 4. The examiner similarly rejected claim 17 under the "machine-or-transformation" test because a "computer readable storage medium" could be broadly interpreted to include "carrier waves," which are not physical objects. *Id.* at 5.

The examiner did *not* reject claims 9-16 on the same Section 101 ground. Those claims are drawn to "A system comprising: a processor; and a computer-readable storage medium having instructions stored which, when executed on the processor …" In other words, these claims are directed to a "machine" and therefore satisfied the "machine-or-transformation" test used by the examiner to reject the other claims. The examiner raised no other Section 101 concerns about claims 9-16 – claims which, Omilia takes pains to point out in its motion – claim the same process steps as claims 1-8 and 17-20. D.I. 131 (Omilia's Sep. Stmt) ¶ 9; Mot. at 18.

In *Bilski*, 561 U.S. 593, the Supreme Court reversed the Federal Circuit's *In re Bilski* decision, holding that the "machine-or-transformation" test was not the sole test governing

[6] The examiner's "machine-or-transformation" based rejection occurred in November 2012, more than two years after the Supreme Court rejected the "machine-or-transformation" test as the sole measure of patent eligibility under Section 101. *Bilski v. Kappos*, 561 U.S. 593 (2010). It is not clear why the examiner failed to incorporate the Supreme Court's ruling into his analysis, but this does highlight an important legal principle—district courts do not give deference to examiners' decisions and are not bound by the USPTO's guidelines. *See Cleveland Clinic Found. v. True Health Diagnostics LLC*, 760 F. App'x 1013, 1020 (Fed. Cir. 2019) (upholding district court's opinion contradicting USPTO guidelines and refusing to give examiner decisions deference, holding while the Federal Circuit "greatly respect[s] the PTO's expertise on all matters relating to patentability, including patent eligibility, [it is] not bound by its guidance.") Thus, the Court is not permitted to give any deference to the examiner's decision which was legally incorrect at the time and is legally incorrect and outdated now.

Section 101 analysis. *Id.* at 604 ("The machine-or-transformation test is not the sole test for deciding whether an invention is a patent-eligible 'process'."). In *Alice*, the Supreme Court went farther, reframing the patentable subject matter inquiry as the now-familiar two-step analysis. *Alice*, 573 U.S. at 218-221. The *Alice* ruling makes no express mention of the "machine-or-transformation" test, but does speak disapprovingly, at step two, of simply appending "apply it with a computer" to claimed abstract ideas, as "mak[ing] the determination of patent eligibility 'depend simply on the draftsman's art.'" *Id.* at 224. Thus, the "machine-or-transformation" test is no longer the governing standard under Section 101, and this passage from the file history is utterly irrelevant to a post-*Alice* analysis of patent eligibility under Section 101.

Put another way, Omilia attempts to shoehorn the examiner's now-discredited "machine-or-transformation" rejection into an argument about abstractness under *Alice*, and then seeks to further shoehorn claims 9-16 (which were allowed) into this re-framed rejection. This is entirely the wrong way around. The examiner found claims 9-16 to be patentable subject matter under Section 101, and regardless of whether it is because claims 1-8 and 17-20 were amended to add a "machine" or because they otherwise cover the same patentable subject matter as claims 9-16, if the file history establishes anything, it establishes that all claims are directed to patent-eligible subject matter under the *Alice* standard now governing Section 101.

C. Omilia's *Alice* Analysis is Jumbled and Erroneous

Omilia's arguments under *Alice* itself fare no better than its misguided analysis of the prosecution history. In a nutshell, Omilia appears to have compounded multiple errors:

- Starting with the examiner's outdated "machine-or-transformation" analysis,
- Equating that analysis to *Alice*'s admonition that the ***step two*** analysis cannot be satisfied by merely taking an abstract idea and appending "apply it with a computer," and
- Moving the "machine-or-transformation"/"apply it with a computer" analysis into *Alice* ***step one***.

See Mot. at 8-10.

As the Federal Circuit has made clear, claims directed to a new and useful technique—for example, for defining a database—that runs on a general-purpose computer are patent-eligible. *Thales Visionix Inc. v. United States*, 850 F.3d 1343, 1349 (Fed. Cir. 2017) (citing *Enfish*, 822 F.3d at 1337–38).

A proper analysis, under the correct standards, in the right order, amply demonstrates that Omilia's motion should be summarily denied at *Alice* step one, and alternatively denied at *Alice* step two. Further alternatively, the factual record, including the Declaration of Chris Schmandt, submitted herewith, demonstrates the existence of disputed material facts at *Alice* step two, precluding entry of partial summary judgment as Omilia requests.

1. *Alice* Step 1: The Asserted Claims of the '993 Patent Are Not Directed to an Abstract Idea

Under *Alice* step one, courts must "determine whether the claims at issue are directed to a patent-ineligible concept," such as abstract ideas. *Alice*, 573 U.S. at 218. Courts have been clear that inventions can be patent-eligible under *Alice* step one, even when they make use of algorithms or mathematical formulas. In *Diamond v. Diehr*, the Supreme Court confirmed the eligibility of patent claims despite the inclusion of a mathematical formula in a claimed method for molding raw, uncured rubber into cured rubber products. 450 U.S. 175, 177 (1981). The claimed method used the well-known Arrhenius equation to calculate the optimal cure time using, among other variables, the internal temperature of the mold. *Id*. at 177 n.2. The invention improved upon prior art molding methods by constantly measuring the actual temperature inside the mold, recalculating the ideal cure time, and automatically opening the press when the ideal cure time equaled the actual time elapsed. *Id*. at 178–79.

In *Enfish*, 822 F.2d 1327, the Federal Circuit held that claims directed to a self-referential logical model for a computer database were patent-eligible under step one of *Alice*. *Id*. at 1330. The disclosed technique enabled faster searching and more effective storage of data than previous methods. *Id*. at 1333. The Federal Circuit found the claims directed to "a specific improvement to the way computers operate, embodied in the self-referential table." *Id*. at 1336.

In finding the claims to be patentable, the court explained that the claims are "not simply directed to any form of storing tabular data, but instead are specifically directed to a self-referential table for a computer database" that functions differently than conventional databases. *Id*. at 1337. *See also Thales Visionix*, 850 F.3d at 1347 (finding patentable under *Alice* step one a new and useful technique for using sensors and the data from the sensors to more accurately calculate the position and orientation of an object on a moving platform); *Rapid Litig. Mgmt. Ltd. v. CellzDirect, Inc.*, 827 F.3d 1042, 1048 (Fed. Cir. 2016) (finding patentable under *Alice* step one claims directed to an improved process of preserving a type of liver cell by taking previously frozen and thawed cells, separating viable cells from non-viable ones, and recovering and refreezing the viable cells, even though the inventors did not claim the natural law of the cells' ability to survive multiple freeze-thaw cycles); *Sophos*, 2016 WL 3149649, at *11 (denying motion for judgment on the pleadings under *Alice* step one).

The '993 Patent is directed to software improving the computer's ability to recognize speech— a "specific implementation of a solution to a problem in the software arts." *Enfish,* 822 F.3d at 1335–36. Prior art systems' language models considered the most probable word in an n-gram (number of words in a string) based on the word itself provided from the acoustic and lexical models, and did not consider differences in pronunciations of words that are realized by different phonemes. *See* '993 Patent, col. 1:26-65. The specification repeatedly explains that the various claimed inventions and embodiments are aimed at improving speech recognition. '993 Patent, col. 3:19-22, 3:45-51, 7:16-20, 7:33-41, 9:35-39, 10:62-65, 10:65-11:5. For example, the specification explains that by modeling "pronunciation dependencies across word boundaries" in the language model is an advantage over the traditional approach and improves the speech recognition. *Id*., col. 7:16-20. To develop such software, the patent claims a new method to create phonetic transcripts of large text corpora by using a small "pronunciation model" of speakers to *approximate* the much larger body of text required to yield a language model. *Id.*, col. 10:1-15. Although many words have different pronunciations (*e.g.*, tom-AY-to, tom-AH-to), the language model's accuracy is further improved by focusing on a handful of the most

frequently used words and their pronunciation probabilities, and using unique labels for these words that are given a special status in the language model. Then, the language model is used to recognize an utterance. This is not problem that exists in the sphere of human recognition of spoken language; it is a software problem related to automated speech recognition.[7]

As such, "the focus of the claims is on the specific asserted improvement in computer capabilities ... [rather than] on a process that qualifies as an 'abstract idea' for which computers are invoked merely as a tool." *Enfish,* 822 F.3d at 1335–36. *See also, e.g. DDR Holdings, LLC v. Hotels.com, L.P.*, 773 F.3d 1245*,* 1258 (Fed. Cir. 2014) (finding eligible under Section 101 a patent claiming a method for retaining visitors on a website through the creation of a digital "store within a store," both because "the claims recite an invention that is not merely the routine or conventional use of the Internet," and also because the claims "do not attempt to preempt every application of the idea of increasing sales by making two web pages look the same," but rather claim an "inventive concept for resolving [a] particular internet-centric problem"); *McRO*, 837 F.3d at 1314–16 (solved computerized animation by using rules different from humans).

The case law Omilia relies on that finds patents to be directed to abstract ideas do not solve a technical problem and are remarkably different from the '993 Patent. *See Elec. Power Grp*., 830 F.3d at 1354 (claims that monitor performance of an electric power grid by collecting data in real-time "do not go beyond requiring the collection, analysis, and display of available information in a particular field, stating those functions in general terms, without limiting them to technical means for performing the functions that are arguably an advance over conventional computer and network technology."); *ChargePoint, Inc. v. SemaConnect, Inc*., 920 F.3d 759, 768

[7] Because all of the independent claims are patent-eligible, each of the dependent claims is also patent-eligible. *E.g., Chamberlain Grp., Inc. v. Linear LLC*, 114 F. Supp. 3d 614, 629 n.3, 632 n.4 (N.D. Ill. 2015). Additionally, and in the alternative, even if the independent claims are deemed to be patent-ineligible, the dependent claims are patent-eligible because they add inventive concepts. *See generally* '993 Patent, col. 3:34-48, 5:46-51, 6:6-45, 7:66-67, 8:6 (discussing features claimed in dependent claims and improvement on speech recognizers). *See Berkheimer*, 881 F.3d at 1365, 1370. SSOF ¶¶ 30-35.

(Fed. Cir. 2019) (specification failed to suggest invention involved overcoming technical difficulty, but suggested invention nothing more than abstract idea of "communication over a network for interacting with a device, applied to the context of electric vehicle charging stations"); *Content Extraction & Transmission LLC v. Wells Fargo Bank, Nat'l Ass'n*, 776 F.3d 1343, 1347 (Fed. Cir. 2014) (recognizing and saving information from a scanned check is nothing more than "the abstract idea of 1) collecting data, 2) recognizing certain data within the collected data set, and 3) storing that recognized data in a memory," something that is well known); *In re TLI Comm'cns, LLC Patent Litig*, 823 F.3d 607, 613 (Fed. Cir. 2016) (claims for taking, transmitting, and organizing digital images not directed to a solution to a "technological problem" but "directed to the abstract idea of classifying and storing digital images in an organized manner"); *Univ. of Fla. Research Found., Inc. v. Gen. Elec. Co*., 916 F.3d 1363 (Fed. Cir. 2019) ("patent nowhere identifies, and we cannot see in the claims, any 'specific improvement to the way computers operate.'"); *Credit Acceptance Corp. v. Westlake Servs*., 859 F.3d 1044, 1054 (Fed. Cir. 2017) (claims "directed to the abstract idea of processing an application for financing a purchase" claimed "a fundamental economic practice long prevalent in our system of commerce."); *Digitech Image Techs., LLC v. Elecs. for Imaging, Inc*. 758 F.3d 1344, 1347-51 (Fed. Cir. 2014) (process of taking two datasets and combining them into a single dataset did not reduce image distortion or otherwise improve image processing, thus claims were not directed to patent-eligible technological improvement but recited "the ineligible abstract idea of gathering and combining data that does not require input from a physical device.").

Desperate to support its jumbled analysis, Omilia takes its argument further, seeking to equate computerized speech recognition technology with human speech recognition. At its apogee of absurdity, Omilia repeatedly postulates, without support, that the '993 Patent merely covers the "purely mental step" of determining what words are contained in an utterance. Mot. at 7 ("This is simply the mental process for determining the most likely word based on typical sounds in words, as well as the sequence of those words."); *Id.* at 8 ("Claim 1 merely recites the mental process of creating and using probabilities in a language model, which is no different than

the mental process of guessing words using a pronunciation dictionary."); *Id.* ("Each step of claim 1 is capable of being performed by a human being without a processor."). Omilia offers no evidence whatsoever to support these bald assertions about human psychology and language recognition. To be clear, computer software capable of recognizing human speech is very much an innovative and novel technology, and is not the same as replicating a human mental process … on a computer. Schmandt Decl. ¶ 52.[8] SSOF ¶ 82.

To recognize speech, humans do not "go through steps in their minds" to transcribe speech using a phonemic transcription dataset associated with a speaker, yield a language model, use pronunciation probabilities or unique labels, or incorporate anything into a language model. The Federal Circuit has recognized that computerized implementations such as this are, indeed, patentable. For example, the patent at issue in *McRO* claimed a "method for automatically animating lip synchronization and facial expression of three-dimensional characters." *McRO*, 837 F.3d at 1307. The Federal Circuit found patentability under *Alice* step one, holding that the claims were directed to "a specific asserted improvement in computer animation, *i.e*., the automatic use of rules of a particular type," *id*. at 1314, and rejected the argument that the claims "simply use a computer as a tool to automate conventional activity" because there was no evidence in the record that "the process previously used by animators [wa]s the same as the process required by the claims." *Id*. (human animators did not employ the type of rules required by the claims, and produced realistic animations of facial movements in fundamentally different ways); *see also CardioNet*, 955 F.3d at 1370–71 (district court erred in finding an abstract idea

[8] Omilia's reliance on a "pen and paper" analogy is similarly flawed because Omilia improperly equates the methods of the '993 Patent with a human's ability to recognize speech, applied to a computer. The "pen and paper" analogy is used to describe patents that replace "pen and paper methodologies" with doing it on a computer. See *Univ. of Fla.*, 916 F.3d at 1368 (claim 1 directed to abstract idea of "collecting, analyzing, manipulating, and displaying data" for facilitating data exchange between bedside machines which was ordinarily done by manual data entry). The '993 Patent does not purport to replicate human speech recognition (on paper or in one's mind), and apply it to a computer, but tries to solve a technical problem—developing software, systems, and devices that improves a computer's ability to recognize speech.

because it is "difficult to fathom how doctors mentally or manually used 'logic to identify the relevance of the variability [in the beat-to-beat timing] using a non-linear function of a beat-to-beat interval' as required" by the claim). The '993 Patent is simply not an attempt to claim how humans mentally understand speech. This contrasts with patents that do purport to claim human perception. For example, in *Blue Spike, LLC v. Google Inc*., No. 14-CV-01650-YGR, 2015 WL 5260506, at *5 (N.D. Cal. Sept. 8, 2015), *aff'd*, 669 F. App'x 575 (Fed. Cir. 2016), the patent actually attempted to claim a human's ability to identify and recognize a signal, such as a song, by claiming qualities of a signal that humans perceive, using a computer.

2. *Alice* Step 2: Alternatively, Extra Elements Are Present; Further Alternatively, Factual Questions Exist

Because the asserted claims of the '993 Patent are not directed to an abstract idea, the Court need not reach *Alice* step two. However, even if it does reach *Alice* step two, the record establishes that additional features are present. The asserted claims are more than simply "moving the pronunciation probabilities from a dictionary to a language model as recited in the claims, is itself an abstract idea." Mot. at 14.

First, the invention results in a language model that behaves differently than if it were to only consider words previously interpreted by the dictionary or lexicon in the ASR. *See generally*, Schmandt Dec. ¶¶ 14–52 (describing prior art systems and the invention of the '993 patent). SSOF ¶¶ 36-82. The claimed language model's ability to use "pronunciation dependencies across word boundaries" enables the recognizer to realize "contextual dependencies like geminates or consistency in pronunciation style throughout the utterance." '993 Patent at 3:33-37, 7:33-50; Schmandt Dec. ¶¶ 38–41. SSOF ¶¶ 65-68. Further, "the introduction of pronunciation dependent word pairs as lexical items changes the behavior of the language model to approximate higher order n-gram language models, also resulting in improved recognition accuracy." '993 Patent, col. 3:45-51. The specification provides, "it is clear that it is advantageous to allow the language model to extract all the available information from the fact that some words commonly have different pronunciations" "which is not easy through

pronunciation modeling within a dictionary," other word variants can be realized such as "the distinction between common variants where the reduction in a vowel determines the difference between the verb and the noun type … could also significantly contribute to performance improvements." *Id*., col. 7:33-41; Schmandt Dec. ¶ 40. SSOF ¶ 67. In developing a language model with pronunciation probabilities, the "lexical items become pronunciation dependent and that pronunciation modeling becomes the provenance of the language model and not the dictionary." *Id*., col. 10:62-65. This is an advantage, because it "allows for better modeling of coarticulation and part-of-speech differences in pronunciation, resulting in a modest gain using a modest number of thus modeled pronunciations." *Id*., col. 10:65-11:5; Schmandt Dec. ¶¶ 16, 51. SSOF ¶¶ 39-41, 81.

Further, Omilia ignores the novel and specific way the language model is supplemented using approximated, phonetically transcribed speech. *See* cl. 1 ("approximating transcribed speech, via a processor," that uses "a phonemic transcription data set associated with a speaker" based "on a pronunciation model of the speaker."); *see also* Schmandt Dec. ¶¶ 42–44. Building on this, pronunciation probabilities associated with the different pronunciations for frequently spoken words are incorporated into the language model. *Id*. ¶¶ 45–48. SSOF ¶¶ 69-77.

Third, the claims additionally require, "after incorporating the pronunciation probabilities into the language model, recognizing an utterance using the language model." Schmandt Dec. ¶ 49. This describes the use of the claimed technology to solve a particular problem, satisfying step two. As the Supreme Court explained in *Alice*, its 1981 ruling in *Diamond*, 450 U.S. 175, can be understood as a finding of patent eligibility under step two: "The claim employed a 'well-known' mathematical equation, but it used that equation in a process designed to solve a technological problem in 'conventional industry practice.'" *Alice*, 573 U.S. at 223 (citing *Diamond*, 450 U.S. at 177, 178). *See also DDR Holdings,*773 F.3d 1245 at 1257 (claims that are "necessarily rooted in computer technology in order to overcome a problem specifically arising in the realm of computer networks" claim an inventive concept and are patent-eligible.); *see also Sophos,* 2016 WL 3149649, at *12 (finding, alternatively, under *Alice* step two, patentable

inventive concept in asserted patents because they "aim to solve a technical problem of electronic messages, which because of their form, present unique challenges for establishing proof of receipt and delivery"). Schmandt Dec. ¶¶ 50. SSOF ¶¶ 78-80.

Finally, the dependent claims expressly claim features of the language model that are inventive concepts that improve the functioning of the speech recognizer. For example, claim 2 further removes the pronunciation probabilities from the dictionary. *See also* cls. 11, 19 (same); *see also* '993 patent, col. 3:26-48, 7:23-32 (results in error rate reduction). Claim 3 further provides the language model is generated by modeling pronunciation dependencies across word boundaries. *See also* cls. 11, 19; *see also* 3:30-37, 7:33-41 (results in improving speech recognition). Claim 5 further comprises pronunciation dependent word pairs as lexical items that change a behavior of the language model to approximate higher order n-gram language models. *See also* cl. 13 (same); *see also* 3:48-51 (also resulting in improved recognition accuracy). Claim 6 further comprises "creating a wide context pronunciation model based on having the pronunciation probabilities in the language model; and determining a probability of observing a particular word in the utterance using the wide context pronunciation model." *See also* cl. 14 (same); *see also* 3:48-41, 6:34-42 (improved modeling and recognition). Last, claim 7 further provides the pronunciation probabilities comprise a set of most frequent words each with more than one pronunciation alternative, and claim 8 depends from claim 7 which further provides "wherein the more than one pronunciation alternative is in the language model." *See also* cls. 15, 16; *see* 7:18-32 ("Recognition accuracy improved even when only a handful of words have pronunciation alternatives"). The specification's description of the claimed language model and its features represented in the dependent claims demonstrate the specific claim elements are inventive concepts that improve a technical process.[9] SSOF ¶¶ 30-35.

[9] Because the dependent claims further illustrate that the "language model" of claim 1 is an inventive concept with additional features, claim 1 should not be found to be well-understood. Nevertheless, the dependent claims cannot be found abstract because they expressly claim

Alternatively, at a minimum, the record establishes the existence of disputed issues of material fact concerning whether the additional features are present. *See Berkheimer*, 881 F.3d at 1368 ("The question of whether a claim element or combination of elements is well-understood, routine, and conventional to a skilled artisan in the relevant field is a question of fact. Any fact, such as this one, that is pertinent to the invalidity conclusion must be proven by clear and convincing evidence."), 1370 (denying summary judgment on dependent claims because "there is at least a material fact in light of the specification"). Nuance has submitted the expert declaration of Chris Schmandt, a pioneering researcher at MIT in the field of speech recognition technology. Schmandt Dec. ¶¶ 4–9. Omilia has submitted nothing. There is utterly no evidence in the record about how humans recognize speech, leaving Omilia's "mental step" arguments unsupported. On the issue of how computerized speech recognizers work, however, Nuance's expert Chris Schmandt has submitted a declaration explaining how computerized speech recognizers work generally, that they are not modeled on human psychology, and that the approach taken by the '993 Patent solves a computer-specific problem in speech recognition, namely, by providing an efficient way to increase the accuracy of a speech recognizer by adding certain pronunciation probabilities to the language model. *See generally*, Schmandt Dec. ¶¶ 14–52. Like its undefended assertions about human psychology, Omilia's assertions about computerized speech recognition are again unsupported. ASR is designed to perform tasks on a computer, with a desired outcome (speech recognition) similar to what humans do naturally, but the '993 Patent does not seek to mimic human perception of speech and instead claims a specific way of improving a computer's ability to recognize speech. Schmandt Dec. ¶ 52. SSOF ¶¶ 36-82.

Omilia also contends that the '993 Patent's teachings are similar to merely using lookup tables on a computer to achieve its result. The cited portions of the '993 Patent on which Omilia

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additional, inventive concepts of the claimed language model. *See* cls. 2, 3, 5, 6, 7, 8, 10, 11, 13, 14, 15, 16, 18, 19. SSOF ¶¶ 30-35.

relies do not mention lookup tables and Omilia completely mischaracterizes the invention. The "pronunciation probabilities" taught in the '993 Patent are more complex probability processes built into the language model that determine which results are more likely than another to be correct. This is not a single value stored in a table. Schmandt Dec. ¶ 56. SSOF ¶ 86.

Additionally, Omilia contends the '993 Patent could simply be performed by a human, but this misconstrues the invention. For example, the claims require "approximating transcribed speech, via a processor, using a phonemic transcription dataset associated with a speaker, to yield a language model." Omilia apparently does not understand what this means, and has completely ignored it. Schmandt Dec. ¶¶ 54–57. SSOF ¶¶ 84-87.

Thus, if the Court even reaches *Alice* step two, the factual record makes clear that the '993 Patent is rooted in computer technology (automated speech recognition, or ASR) in order to solve a problem (efficiently improving accuracy of ASR systems) that specifically arises in the realm of computerized speech recognition. Alternatively, if the Court does not outright find in Nuance's favor on this issue, then it must draw all reasonable inferences in favor of Nuance, the non-moving party, and find that there exists a genuine issue of disputed material fact as to whether the claim elements involve more than well-understood, routine and conventional elements, which precludes entry of partial summary judgment as requested by Omilia.

IV. CONCLUSION

For the foregoing reasons, no asserted claim of the '993 Patent is directed to an abstract idea, and Omilia's motion should be denied under *Alice* step one. Additionally or in the alternative, to the extent the court reaches *Alice* step two, the uncontested factual record establishes that each asserted claim has a sufficient "additional feature" beyond any purported abstract idea. Further alternatively under *Alice* step two, at a minimum there exist disputed factual issues. Under any of these analyses, Omilia's motion should be denied.

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Respectfully submitted,

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CERTIFICATE OF SERVICE

I hereby certify that this document and all supporting declarations will be filed through the ECF system and will be sent electronically to the registered participants as identified on the Notice of Electronic Filing (NEF) and paper copies will be sent to those indicated as non-registered participants on July 30, 2020.

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